

"Dedicated to Public Service"

THE RADIATOR



W6RHC

IRL #8170



www.gearsw6rhc.org

P.O.Box 202 Chico, CA 95927-0508

Founded: August 13, 1939

October, 2017

Coming Events

O.A.R.S. GENERAL MEETING Second Friday, of month, 7:00 p.m., at St. Paul's Church Parrish Hall, 1430 Pine St., Oroville

G.A.R.S. Second Thursday of month, 6:30 p.m. Lutheran Church Hall, Artois; .

G.E.A.R.S General Meeting, third Friday of month, Butte County Search and Rescue Bldg., Chico. Social hour 6:00, meeting at 7:00.

Board Meetings: 2nd Saturday of month

Butte A.R.E.S. MEET: fourth Friday, at Butte County Search and Rescue Building.

FCC EXAMS - GEARS VEC

First Sunday of every even numbered month.

At the Butte County Search and Rescue Building,. Written test at 2:00 p.m. For information or pre-registration call Tom Rider -W6JS; 530-893-9211

Club Events: News and items of interest
GEARS Calendar...all inside.



Picture courtesy EVARC

The Prez' Says:

QST de KA6GND

Welcome to Autumn everyone and I hope that those that were able to attend the steak Bake in Oroville had a fun time! Speaking of fun, we have an event coming up on Saturday, October 14th at the Gateway Science Museum that will give us a great opportunity to tell the public about ham radio. Kris Koenig, KK6QYL has been working hard to put this event together at the Museum, which is located on the Esplanade next to Bidwell Mansion. A lot of families visit the museum and we will be positioned right outside where they can see the many facets of amateur radio.



The words that Kris put together really describes the versatile hobby that we are part of. "Join the Golden Empire Amateur Radio Society here at the museum on October 14th and discover the magic of HAM radio. Ping a signal off a satellite, listen to a conversation in morse code, learn about the importance of emergency communication that HAM radio operators provide and talk to someone across the globe. Explore the world of digital HAM radio and how HAM radio is no longer just microphones and vacuum tubes. Learn how to get your HAM license. It's fun for the whole family"

We will be demonstrating from 1-3pm, so if you would like to be part of this exciting experience, please contact Kris at 530-321-7827 or email him at kris@koenigfilms.com. It is time for all hands-on deck to further our visibility in the area.

We recently sent up a special email asking if you would take a few moments to take an online survey regarding our monthly meetings. If you have not had a chance to do so yet, would you please do so at:

<https://www.surveymonkey.com/r/L5NY6RZ>

(Continued on page 2)

Michael Favor, N6FAV is our Nominations Chair again this year he is searching for members who would like to serve on the Board of Directors next year. If you are able to step up and serve, please contact Michael at 530-899-8877.

Hope to talk to you on the air soon - remember, "The Sky is the Limit with Amateur Radio"!

Larry Marcum, KA6GND
GEARS President
ka6gnd@gmail.com
530-345-5399.

Michael Favor N6FAV to Chair Nominating Committee

GEARS Constitution provides the Election Chairperson shall select two members from the general membership who with him, will comprise his Election Committee. At the October general meeting the committee will seek from the membership their recommendations for elected officers for the following year (2018). Before the November general meeting and the December general meeting the GEARS membership shall be notified by e-mail or snail mail of the candidates.

Election of Officers is held during the December general meeting and the Nominating/Election Committee shall have charge of the election.

Give serious (and positive) consideration to stepping up to fill a leadership position for GEARS. Active participation by members ensures a robust, vibrant community service oriented GEARS Club.

ARRL Pacificon Convention

Oct. 20-22, 2017

Register online now at www.pacificon.org for the October 20-22, 2017 ARRL Pacificon Division Convention at the San Ramon Marriott. PACIFICON is the annual ARRL Pacific Division convention, held each year in October. It is THE premier amateur radio conference in the western U.S.

If you do not plan to attend the Pacificon convention, reach out to your local Brownies, Cubs, Boys or Girl Scout troop to offer an Amateur Radio demonstration and to support their participation in the Oct. 20-22 [Jamboree on the Air](#) (JOTA) to communicate with other scouts around the world. Offer to help your local Brownies, Cub Scouts, Girl Scouts and Boy Scouts earn the [Scouting Radio Merit Badge](#) and the

[ARRL Girl Scout Radio and Wireless Technology Patch](#)..

Our website, [Facebook](#) and [Twitter](#) pages are a work in progress, and your suggestions and submissions are always welcome.

This website is visited most during the first week of each month, but do check back as it is updated weekly with late breaking news.

73, Dr. Carol Milazzo, KP4MD

American Radio Relay League Sacramento Valley
Section Manager
kp4md@arrl.org

Faraday cage (From Wikipedia, the free encyclopedia)

A Faraday cage or Faraday shield is an enclosure used to block [electromagnetic fields](#). A Faraday shield may be formed by a continuous covering of [conductive material](#) or in the case of a Faraday cage, by a mesh of such materials. Faraday cages are named after the English scientist [Michael Faraday](#), who invented them in 1836.^[1]

A Faraday cage operates because an external electrical field causes the [electric charges](#) within the cage's conducting material to be distributed such that they cancel the field's effect in the cage's interior. This phenomenon is used to protect sensitive [electronic equipment](#) from external [radio frequency interference](#) (RFI). Faraday cages are also used to enclose devices that produce RFI, such as [radio transmitters](#), to prevent their radio waves from interfering with other nearby equipment. They are also used to protect people and equipment against actual electric currents such as [lightning](#) strikes and [electrostatic discharges](#), since the enclosing cage conducts current around the outside of the enclosed space and none passes through the interior.

Faraday cages cannot block stable or slowly varying magnetic fields, such as the [Earth's magnetic field](#) (a [compass](#) will still work inside). To a large degree, though, they shield the interior from external [electromagnetic radiation](#) if the conductor is thick enough and any holes are significantly smaller than the [wavelength](#) of the radiation. For example, certain [computer forensic](#) test procedures of electronic systems that require an environment free of [electromagnetic interference](#) can be carried out within a screened room. These rooms are spaces that are completely enclosed by one or more layers of a fine metal mesh or perforated sheet metal. The metal layers are grounded to dissipate any electric currents generated from external or internal electromagnetic fields, and thus they block a large amount of the electromagnetic interference. See also [electromagnetic shielding](#). They provide less attenuation from outgoing transmissions versus incoming: they can shield EMP waves from natural phenomena very effectively, but a tracking device, especially in upper frequencies, may be able to penetrate from within the cage (e.g., some cell phones operate at various radio frequencies so while one cell phone may not work, another one will).

A common misconception is that a Faraday cage provides full blockage or attenuation; this is not true. The reception or transmission of [radio waves](#), a form of [electromagnetic radiation](#), to or from an [antenna](#) within a Faraday cage is heavily attenuated or blocked by the cage, however, a Faraday cage has varied attenuation depending on wave form, frequency or distance from receiver/transmitter, and receiver/transmitter power. Near-field high-powered frequency transmissions like HF RFID are more likely to penetrate. Solid cages generally provide better attenuation than mesh cages.

History

In 1836, Michael Faraday observed that the excess charge on a charged conductor resided only on its exterior and had no influence on anything enclosed within it. To demonstrate this fact, he built a room coated with metal foil and allowed high-voltage discharges from an electrostatic generator to strike the outside of the room. He used an [electroscope](#) to show that there was no electric charge present on the inside of the room's walls.

Although this cage effect has been attributed to [Michael Faraday's famous ice pail experiments](#) performed in 1843, it was [Benjamin Franklin](#) in 1755 who observed the effect by lowering an uncharged cork ball suspended on a silk thread through an opening in an electrically charged metal can. In his words, "the cork was not attracted to the inside of the can as it would have been to the outside, and though it touched the bottom, yet when drawn out it was not found to be electrified (charged) by that touch, as it would have been by touching the outside. The fact is singular." Franklin had discovered the behavior of what we now refer to as a Faraday cage or shield (based on Faraday's later experiments which duplicated Franklin's cork and can).^[2] Additionally, [Giovanni Battista Beccaria](#) discovered this effect a long time before Faraday too.^[3]

Operation

Continuous

A continuous Faraday shield is a hollow conductor. Externally or internally applied electromagnetic

Operation

Continuous

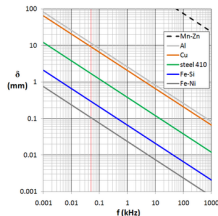
A continuous Faraday shield is a hollow conductor. Externally or internally applied electromagnetic fields produce forces on the [charge carriers](#) (usually electrons) within the conductor; the charges are redistributed accordingly due to [electrostatic induction](#). The redistributed charges greatly reduce the voltage within the surface, to an extent depending on the capacitance, however, full cancellation does not occur.^[4]

Interior charges

If a charge is placed inside an ungrounded Faraday cage, the internal face of the cage becomes charged (in the same manner described for an external charge) to prevent the existence of a field inside the body of the cage, however, this charging of the inner face re-distributes the charges in the body of the cage. This charges the outer face of the cage with a charge equal in sign and magnitude to the one placed inside the cage. Since the internal charge and the inner face cancel each other out, the spread of charges on the outer face is not affected by the position of the internal charge inside the cage. So for all intents and purposes, the cage generates the same [DC](#) electric field that it would generate if it were simply affected by the charge placed inside. The same is not true for electromagnetic waves.

If the cage is [grounded](#), the excess charges will go to the ground instead of the outer face, so the inner face and the inner charge will cancel each other out and the rest of the cage will retain a neutral charge.

Exterior fields



Skin depth vs. frequency for some materials at room temperature, red vertical line denotes 50 Hz frequency:

Mn-Zn – magnetically soft [ferrite](#)

Al – metallic [aluminum](#)

Cu – metallic [copper](#)

steel 410 – magnetic [stainless steel](#)

Fe-Si – [grain-oriented electrical steel](#)

Fe-Ni – high-permeability [permalloy](#) (80%Ni-20%Fe)

Effectiveness of shielding of a static electric field is largely independent of the geometry of the conductive material, however, static magnetic fields can penetrate the shield completely.

In the case of a varying electromagnetic fields, the faster the variations are (i.e., the higher the frequencies), the better the material resists magnetic field penetration. In this case the shielding also depends on the [electrical conductivity](#), the magnetic properties of the conductive materials used in the cages, as well as their thicknesses.

A good idea of the effectiveness of a Faraday shield can be obtained from considerations of [skin depth](#). With skin depth, the current flowing is mostly in the surface, and decays exponentially with depth through the material. Because a Faraday shield has finite thickness, this determines how well the shield works; a thicker shield can attenuate electromagnetic fields better, and to a lower frequency.

Faraday cage continued next page:

Faraday cage

Faraday cages are Faraday shields which have holes in them and are therefore more complex to analyze. Whereas continuous shields essentially attenuate all wavelengths shorter than the skin depth, the holes in a cage may permit shorter wavelengths to pass through or set up "[evanescent fields](#)" (oscillating fields that do not propagate as EM waves) just beneath the surface. The shorter the wavelength, the better it passes through a mesh of given size. Thus to work well at short wavelengths (i.e., high frequencies), the holes in the cage must be smaller than the wavelength of the incident wave. Faraday cages may therefore be thought of as [high pass filters](#).

Examples

Faraday cages are routinely used in [analytical chemistry](#) to reduce noise while making sensitive measurements.

- Faraday cages, more specifically dual paired seam Faraday bags, are often used in digital forensics to prevent remote wiping and alteration of criminal digital evidence. The US and NATO [Tempest](#) standards, and similar standards in other countries, include Faraday cages as part of a broader effort to provide [emission security](#) for computers.

- Automobile and airplane passenger compartments are essentially Faraday cages, protecting passengers from electric charges, such as lightning. A [booster bag](#) (shopping bag lined with [aluminium foil](#)) acts as a Faraday cage. It is often used by shoplifters to steal [RFID](#)-tagged items.^[5]

Similar containers are used to resist [RFID skimming](#). [Elevators](#) and other rooms with metallic conducting frames and walls simulate a Faraday cage effect, leading to a loss of signal and "dead zones" for users of [cellular phones](#), [radios](#), and other electronic devices that require external electromagnetic signals. During training firemen and other first responders are cautioned that their two-way radios will probably not work inside elevator cars and to make allowances for that. Small, physical Faraday cages are used by electronics engineers during equipment testing to simulate such an environment to make sure that the device gracefully handles these conditions.

Properly designed conductive clothing can also form a protective Faraday cage. Some electrical [linemen](#) wear Faraday suits, which allow them to work on live, high-voltage power lines without risk of electrocution. The suit prevents electric current from flowing through the body, and has no theoretical voltage limit. Linemen have successfully worked even the highest voltage ([Kazakhstan's Ekibastuz–Kokshetau line](#) 1150 kV) lines safely.^[*citation needed*]

Austin Richards, a physicist in California, created a metal Faraday suit in 1997 that protects him from tesla coil discharges. In 1998, he named the character in the suit Doctor

Doctor MegaVolt and has performed all over the world and at [Burning Man](#) nine different years .

The scan room of a [magnetic resonance imaging](#) (MRI) machine is designed as a Faraday cage. This prevents external RF (radio frequency) signals from being added to data collected from the patient, which would affect the resulting image. Radiographers are trained to identify the characteristic artifacts created on images should the Faraday cage be damaged during a [thunderstorm](#).

A [microwave oven](#) utilizes a Faraday cage, which can be partly seen covering the transparent window, to contain the electromagnetic energy within the oven and to shield the exterior from radiation.

Plastic bags that are impregnated with metal are used to enclose [electronic toll collection](#) devices whenever tolls should not be charged to those devices, such as during transit or when the user is paying cash.^[6]

The shield of a [screened cable](#), such as [USB](#) cables or the [coaxial cable](#) used for cable television, protects the internal conductors from external electrical noise and prevents the RF signals from leaking out.

##



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Club Officers: (Board of Directors)

PresidentLarry Marcum-ka6gnd
Vice President..... Stephen Wolske-kf6hss
Secretary Michael Favor—n6fav
Treasurer..... ..Rick Hubbard- ki6vos
Past PresidentAnna Horn Kg6goa
Director..... Tom Rider-W6JS
Director..... ..Gene Wright-wa6zrt
Director..... Dale Anderson kk6evs

Club Meetings:

General Meeting Third Friday 7:00 PM

Board Meeting Second Saturday

GEARS Club Net

Tuesdays 7:30 PM 146.850 MHz-PL 110.9

GARS Club Net:Monday,7:00 pm 147.105+Mhz
PL 110.09

Thursdays Simplex Net 7:30 p.m. 146.52

Sacramento Valley Traffic Net

Nightly 9:00 PM 146.850 MHz-PL 110.9

ARES Nets:

Butte Mondays 20:00 146.850 MHz-PL 110.9

Yuba Sutter Thursdays 19:00 146.085+MHz PL 127.3

Glenn Thursday 19:30 147.105 MHz +PL 100.0

Other Nets:

Willie Net 8:00 PM Mondays 1930 kHz

Sac Valley Section Net—7:00 PM 2nd Wed of the
month 146.085 MHz+PL 127.3

440 Wed. Night 8:00 PM Wednesday 440.650 MHz

Golden Bear 7:00 PM Daily 3975 kHz Western Public
Service System (WPSS)

7:30 PM 3952 kHz

ARISS (*International Space Station*) Uplink 144.490

MHz Downlink 145.800 MHz

Hope-1 satellite: all uplinks are in 145Mhz band:

All downlinks are in 435Mhz band

...California Traffic Net: 3906 KHz nightly @6:00

pm .For traffic listing & @6:30 p.m. for roll call.

The GEARS Newsletter Staff:

Editor and Publisher.....Dorothy Post

Printing & Distribution snail mail: Evelyn Weir

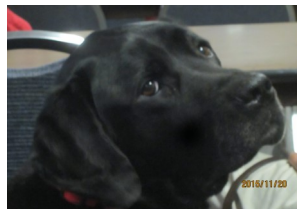
Website...Michael Favor-N6FAV

The Radiator is a monthly publication of the Golden Empire Amateur Radio Society (GEARS). It is the policy of the Editor to publish all material submitted by the membership provided such material is in good taste, relevant to amateur radio, of interest to GEARS members, and space is available. Please send all submissions to the Editor – Dorothy Post by the last day of the month through the following medium: E-mail: dj@posthouse.us

I learned the food snacks for the October 20th meeting will be provided by Tom Rider W6JS and Dale Anderson KK6EVX— I am not allowed to partake of any of the special treats you all have, but I do love the scents and enjoy trying to figure out what it is you are all enjoying .

You all do appear to have a pleasant time in each other's company, and that is special!

Hope to see you on October 20th!



Brinkley, K9DOG



Date	Time	Event	Location	Contact party
Sunday, October 1, 2017 Sunday , December 3, 2017	2:00 p.m.	VEC—Exams	Butte Co. Search & Rescue Building 2591 Morrow Lane, Chico	Tom Rider 530-893-9211
Thursday October 12, 2017 Second Thursday each month	6:30 p.m. Board and General Meeting .	GARS-Glenn Glenn Amateur Radio Society \\	Lutheran Church Hall: Artois	Mike Ellithorpe 530-518-3730
Friday, October 13, 2017 Second Friday each month	General Meeting	OARS Oroville Amateur Radio Society General Meeting	St Paul's Church Parrish Hall 1430 Pine Street Oroville	Ron Osborne-kd7uhf 530 589 1834 kd7uhf@yahoo.com
Saturday October 14 Second Saturday Each month	Board meet: 9:00 a.m.	GEARS Board of Di- rectors Meet Members are Invited!	Blood Source Blood Source Bldg 555 Rio Lindo Ave	Larry Marcum, KA6GND 530 345 5399 ka6gnd@gmail.com
Friday October 20, 2017 Third Friday each month.	Open 6:00 p.m.	GEARS Golden Empire Amateur Radio Society	Butte County Search and Rescue Building 2591 Morrow Lane Chico	Larry Marcum, KA6GND 530 345 5399 ka6gnd@gmail.com
October, 2017	GEARS Breakfast	GEARS Saturday Breakfast Funtime	<i>Country Waffle located on Notre Dame Blvd at the Raley's Plaza entrance: 9:00 a.m.</i>	Larry Marcum, KA6GND 530 345 5399 ka6gnd@gmail.com

Bring Your Old Eyeglass Wear to GEARS for the
 LIONS Club Eyeglasses donation Box
 Prescription glasses, or magnifying eyeglasses, sunglasses, but no loose lens—frames are a necessity.
 This is a club community effort in which all members may participate with minimal effort.

!Donations to GEARS are TAX DEDUCTIBLE!
 We are covered under a 501 c 3 organization, and as such, donations, cash, or materials, donated to GEARS are
 Tax deductible. When you donate to GEARS, be sure you receive a letter of acknowledgment
 from our Secretary as proof of the donation and its value for the State and Federal Tax
 Authorities. This is a win-win for GEARS and for you, the member or the party donating!